TECHNOLOGY FOR

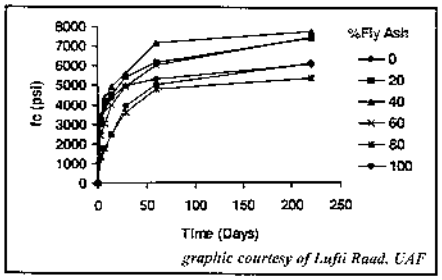
Alaskan Transportation

Winter 1995
Volume 20 Number 4
October-December 1995

Local Technical Assistance Program

Coal ash offers multiple solutions

Imagine solving a number of different problems with the development of a new and better product. This is what happened with a recently completed Alaska Science & Technology Fund (ASTF) Project. David Evans, president of Evans Industries in Healy, Lufti Raad, Professor and Director of the UAF Transportation Research Center, and graduate student D. Andrew Church submitted their final report on their project, "Use of Alaskan Coal Ash in Construction."



Variation of compressive strength with percent fly ash replacement of sand (by weight).

Utilities that use coal burning generators produce more than just electricity—they also produce large quantities of waste in the form of fly ash. In Alaska, it's estimated that approximately 200 tons of coal ash are produced daily. In the past, this waste product had to be transported and disposed of in dumping sites at great costs to the electric companies and consumers, and to the environment.

In Australia, Europe, and throughout the United States, utilities and construction companies have recognized the value and benefits of fly ash as an additive in cement. This ASTF project has been the first attempt to examine this use for cements in our harsher conditions.

Evans and Raad set out to classify Alaskan coal ash into its various types, develop mix-design criteria and procedures, and then test the fly ash/con-

See **Coal Ash** *on page 4*

Plow shield improves visibility

Plow operator Chuck Mann's first reaction to a new European snowplow design was, "When can we have more of these?"

Poor visibility is a snow plow operator's enemy, and not just during a storm. Even when the skies are blue, operators often have to squint through whiteouts of snow stirred up by their own blades.

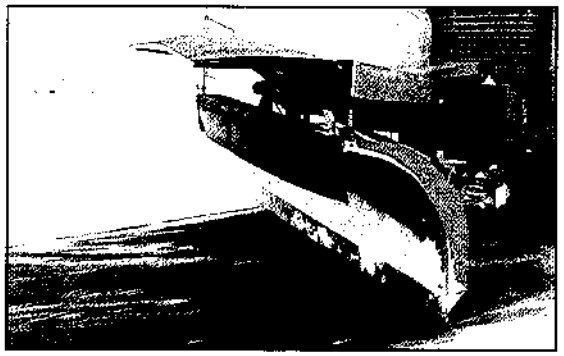


Photo courtesy of Iowa Center for Transportation Research and Education

This plow shield has been shown to improve driver visibility.

The Iowa Department of Transportation is testing a prototype snow plow shield designed to eliminate or greatly reduce the cloud of snow from coming over the plow and onto the truck windshield. Based on

See **Shield** *on page 3*

In this issue...

Inserts...

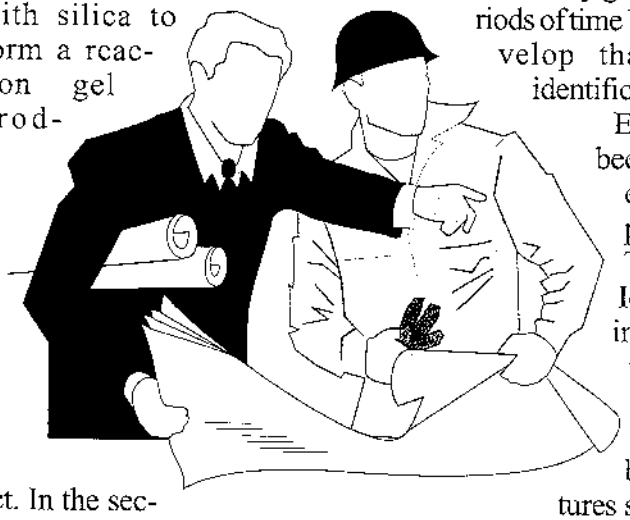
Plus...

This newsletter is funded by a grant from the Federal Highway Administration and the Alaska Department of Transportation and Public Facilities.

ASR detection discussed at SHRP showcase

Alkali-Silica Reactivity (ASR) is a major cause of deterioration to highway structures and concrete pavements in the United States. This subject was the topic of a recent Federal Highway Administration (FHWA) Strategic Highway Research Program (SHRP) Showcase sponsored by the Oregon Department of Transportation in La Grande, Oregon. At the showcase, public and industry representatives from across the Northwest and other areas learned how to identify avoid or mitigate the effects of ASR.

ASR causes damage through expansion and cracking. There are three requirements that must be satisfied for expansive ASR to occur: reactive forms of silica or silicate in the aggregate; sufficient alkali primarily from the cement; and sufficient moisture in the concrete. If any one of these requirements is not met, expansion due to ASR will not occur. In a simplified form, alkali reacts with silica to form a reaction gel product. In the second step, the gel reaction product swells as it absorbs moisture. The presence of this gel product is evidence that an alkali-silica reaction has occurred. Unfortunately, this gel is nearly imperceptible to the naked eye. ASR may go undetected for long periods of time before severe stresses develop that may lead to its identification.



Evidence of ASR has been found in virtually every state. While the Departments of Transportation in Alaska, Idaho, Oregon and Washington have not identified major problems in their structures and pavements, distresses have been found in other structures such as dams, so the potential is present. A rapid field procedure has been developed to identify the presence of ASR reaction products in concrete. The detection of this product does not necessarily reflect the development or severity of distress, so more precise laboratory examination and assessment of associated distresses should follow. With proper identification, testing, design and construction, the chance that ASR will develop can be minimized. If expansive ASR is identified in existing structures, there are measures to counteract its effects. Research is continuing into ways to both prevent and mitigate the effects of ASR. Professionals responsible for the design, construction and maintenance of concrete structures and pavements should be aware of the potential for ASR and be able to identify it before detrimental distresses can develop. To aid these individuals, the following reference is highly recommended: "Handbook for the Identification of Alkali-Silica Reactivity in Highway Structures," by David Stark of Construction Technology Laboratories, Inc. A limited quantity of this publication, number FHWA-SA-94-037, is available at no cost from the FHWA's Research and Technology Report Center (703) 285-2144. Another excellent source of information is your state Department of Transportation Materials Section.❖

News & Views

The University of Alaska, in cooperation with USDA Agricultural Research Service and the Cold Regions Research & Engineering Laboratory will be holding an *International Symposium on Physics, Chemistry and Ecology of Seasonally Frozen Soils.* The symposium will be held at the University of Alaska Fairbanks on June 10-12, 1997. Plenary and poster sessions are planned for the symposium. Following the symposium, a one day tour will allow attendees to visit field research projects and to view natural frozen soil features in the Fairbanks area.

Scientists, engineers and conservationists are invited to present papers related to the occurence, measurement, and prediction of physical and biological processes in frozen soils. Topics of specific interest are those relating to the climatology, physics, chemistry and ecology of seasonally frozen soils.

Authors intending to offer a paper/poster are required to submit an abstract (in English) of no more than one page by April 1, 1996. Abstracts should include (in this order): author(s), title, text, corresponding author's address and telephone number.

For more information contact Brenton Sharratt at (612) 589-3411 or Jerry Radke at (515) 294-0213.

❖ ❖ ❖

The 8th International Conference on Asphalt Pavements will be held August 10-14, 1997 at the University of Washington campus in Seattle, Washington. The conference will embrace research and practice with respect to design, construction and performance of flexible pavements. Plenary sessions, parallel paper and workshop sessions, as well as poster sessions are planned for the conference. For more information and to receive upcoming announcements and registration materials, contact Engineering Professional Programs, 3201 Fremont Ave. North, Seattle, WA 98103 or call (206) 543-5539.

Smart eating wakes up the night shift

As many readers know all too well, public works and highway department crews often battle snow and sleet through many nights. Recent research into sleep deprivation has revealed some ways to lessen the effects of loss of sleep. One set of findings suggests what to eat before and during night-time work. During night-time hours, the body slows down. It does not want to digest a donut, a Whopper with Cheese, a Big Mac, or most other fast foods. Greasy, heavy protein foods bring on sleep. Operators can still enjoy eating with well balanced meals and snacks. Such meals are compatible with a slower, night-time digestive system.

• Main meal before night work: Light protein foods - chicken, turkey, fish, cooked beans and peas; low fat foods only, no heavy fats such as fried foods or donuts. Also include some fruits, vegetables, breads and pasta or potatoes. Add some low fat or skim milk and some cheeses or yogurt to round out this meal.

• Meals during breaks: Soup and salad; soup and a light sandwich; light protein foods and vegetables.

• Snacks before and during work: Low fat dairy products, fruit, popcorn, cereal, plain cookies and baked crackers.

Coffee and tea contain caffeine, and smoking and chewing tobacco contain nicotine. These are initially stimulants, but soon become depressant; they make the heart beat slower. Do not consume alcohol before or during snow plowing operations.

Adapted with permission from Road Business, *Fall 1994.*❖

Shield

Continued from page 1

a design used in Austria and Germany, the innovative shield creates an airfoil that draws snow spray away from the cab and under the wheels of the plow.

Leland Smithson, deputy director of the maintenance division at the Iowa DOT, brought pictures of the shield back to Iowa after participating in the International Winter Scanning Program in March 1994. The program was a cooperative effort with the Federal Highway Administration's Office of International Outreach Programs.

Smithson showed the pictures to Rex Brown, a fabrication welder for the state services and maintenance shop in Ames. Together they discussed specifications for the design. Working mostly from the pictures and Smithson's description and after discussing the concept with several snow plow operators, Brown designed a similar shield.

Using a bracket welded to the main frame of the snow plow, the shield's basic, universal mounting can be installed on different types of blades. The shield's angle is adjustable to allow operators to fine-tune the air foil for maximum effectiveness.

"These shields are inexpensive (about $260) and should make snow plow operators' jobs a lot easier and safer," says Smithson.

Prototype shields are now being tested by Iowa DOT snow plow operators in Williams, Latimer, Forest City, Leon, Cherokee, Rock Rapids, Urbana, Avoca, Atlantic, Ames and Dewitt. Operators are documenting the shields' effectiveness under various situations:

•changing the degree of the shield angle;

• testing the most effective length of the shield's "tail" (some tails are 12 inches, some are 22 inches);

• sliding the shield to the right or left;

• testing plows with and without the shield under identical conditions;

• checking visibility in front of and behind the plow;

• checking motorists' visibility.

So far the prototype shields have undergone rigorous testing and preliminary feedback from the operators has been positive. "Snow over the cab is diminished," says Mark Wright, resident maintenance engineer in Rock Rapids.

In fact, the shield has resulted in at least one unexpected benefit: less wear on the windshield of the plows.

"The biggest benefit comes from eliminating most of the sand spray that usually gets on the windshield," says Steve Bobs, highway maintenance supervisor in Avoca. He has traditionally had to replace snow plow windshields every three to four years because sand under the windshield wipers scratches the glass so severely.

Richard Johnson, highway maintenance supervisor in Williams, has had a similar experience. "It keeps the wipers free of ice, which makes for a lot less use of the wipers, which means less scratching on the windshield," he says.

Mounting the shield has not been difficult. "It was as easy as we were told," says Jack Olson, mechanic at Cherokee.

"It went on easy," agrees Ray Isom, maintenance supervisor at DeWitt. "It would be no problem to move it to a different plow."

Last year's snowfalls in Iowa were wet and mildly heavy. Operators are eager this year to test the shield against a light fluffy snowfall when poor visibility is really a problem. For more information or for detailed test results, contact Leland Smithson at (515) 239-1519.

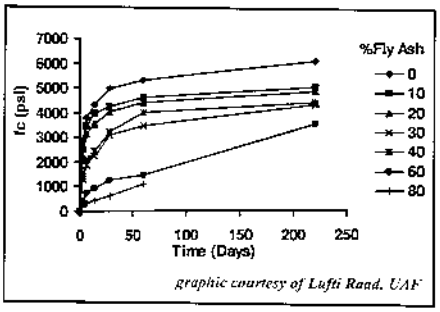
Adapted with permission from Technology News, *February 1995.*❖

Coal Ash

Continued from page 1

crete products under controlled conditions.

Using fly ash collected from coal generation plants in Interior Alaska, the researchers met and exceeded all of their original objectives. A road test using the fly ash concrete was constructed in Healy. In addition, a section of the road included an underlying road bed composed of fly ash aggregate. Tests revealed that when used in proper proportions, the fly ash was a superior additive when compared with traditional combinations used in construction—and, the mixtures were better suited to our severe temperatures and climatic conditions.



Variation of compressive strength with percent fly ash replacement of cement (by weight).

The result has been to establish design and engineering criteria that brings together an existing industry with an Alaskan resource, while also solving a number of separate problems.

Use of a waste product to produce a better construction product has a number of benefits for Alaska:

· It is estimated that the combined cost savings to just one utility, Golden Valley Electric Association, could reach $1.3 million per year.

· Use of fly ash concrete mixtures should minimize maintenance costs of facilities built using the product.

·Alaska's landfills will get welcome relief from the abundance of fly ash waste.

Evans and Raad's project was funded by ASTF in 1991. ASTF granted $99,698 to the study, and the grantees arranged for an estimated $132,000 in matching support. Yet the results of this one project—if implemented—can mean an overall cost savings to Alaskans in the many millions of dollars per year, improved construction products, and greater protection to our environment.

Adapted with permission from "Alaska Science & Technology Foundation News," *Summer 1995.* v

ALASKA TRANSPORTATION
TECHNOLOGY TRANSFER
Local Technical Assistance Program
Department of Transportation and Public Facilities
2301 Peger Road M/S 2550
Fairbanks, AK 99709-5399

address correction requested

BULK RATE
U.S. Postage
PAID
Fairbanks, AK
Permit No. 87

Pre-start inspection is an important step

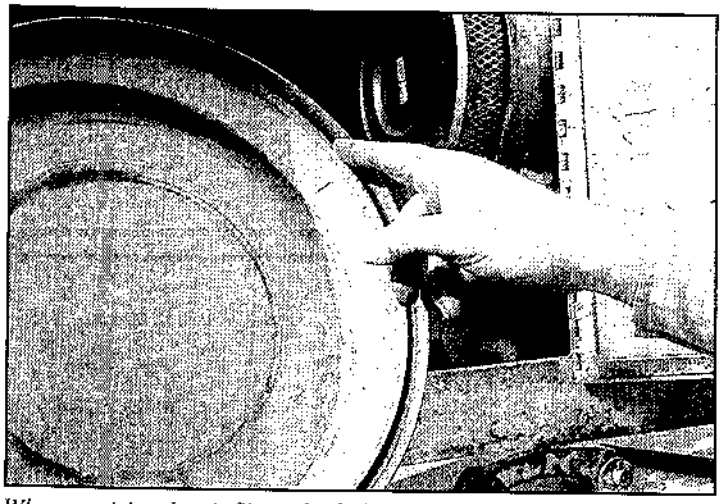
The photographs on the following pages were taken during an actual walk-around inspection conducted by Al Hauser and Don Neary during a regular motor grader operator short course.

One of the most important aspects of motor grader operation is the pre-start inspection. Insuring that your grader is in proper operating condition not only preserves a financial investment made by your agency, it also prevents against costly breakdowns out on the road and keeps you, the operator, in a safe work environment.

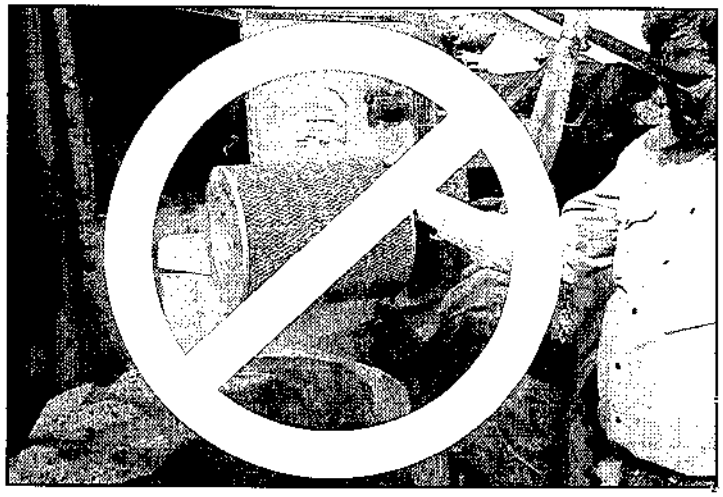
(All photos courtesy of Nebraska T² Center)

Special considerations for winter operations:

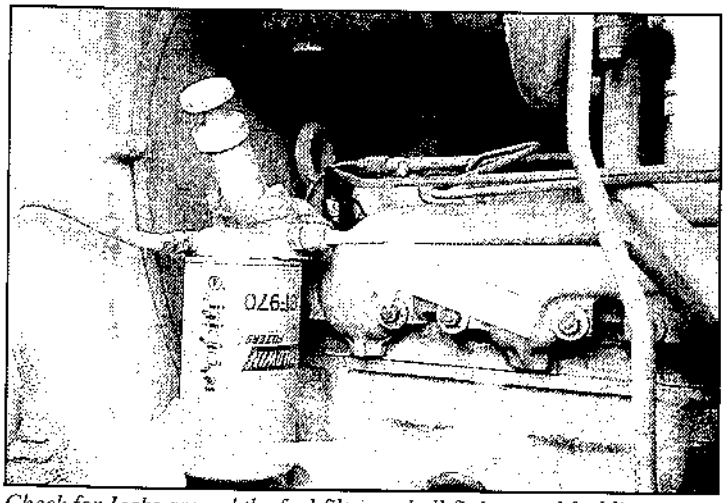
- Check engine block heaters and pre-heaters before cold weather sets in.
- Know what type of engine you are running before using starting fluids.
- Never use starting fluids on engines with glow plugs.
- Review cold weather starting procedures in the operator's manual.
- Understand the proper way to jump the batteries in the event that this is necessary



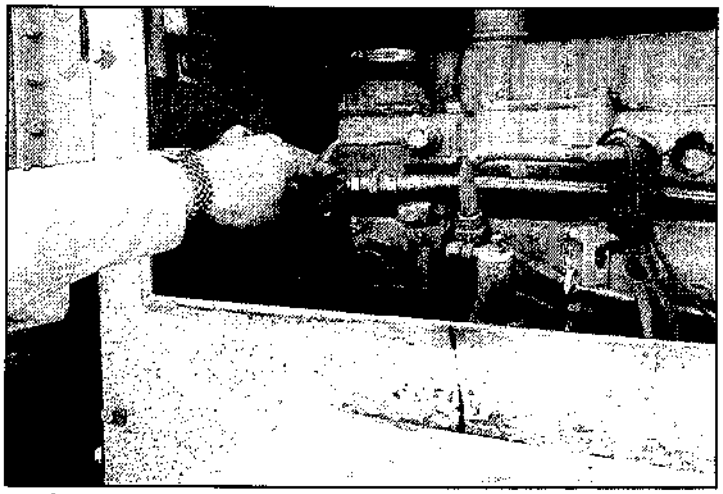
When servicing the air filter, check the gasket and the inner filter. If the gasket is damaged, unfiltered air can make its way through the system and into the engine.



Do NOT bang the air filter against a tire or other object. Doing so will distort the shape of the filter, degrading the seal to the intake. If the filter is dirty, replace it!

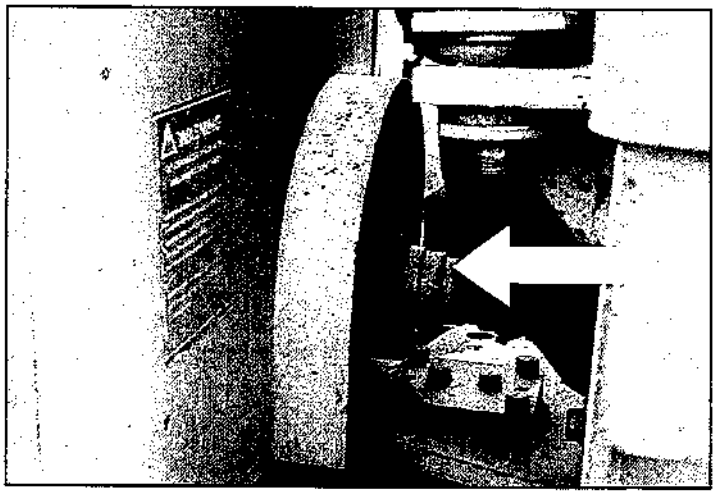


Check for leaks around the fuel filter and all fittings and fuel lines leading to the engine. An accumulation of moist dirt is an indication of a leak.

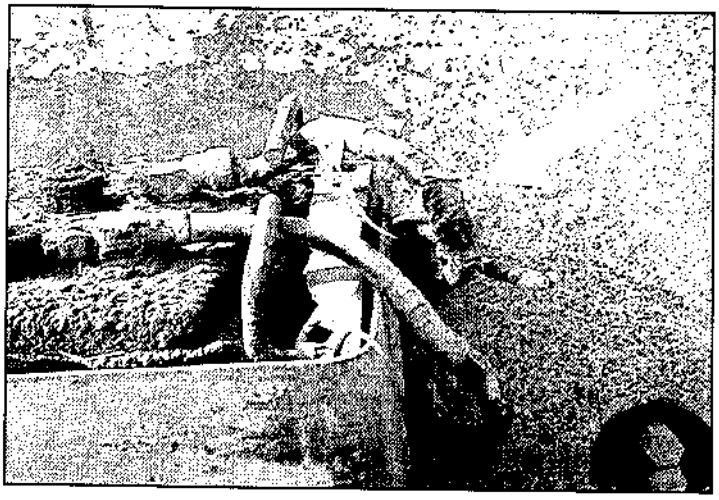


At the air compressor, check for leaks in the air system. Examine the compressor unit and all fittings and air lines. An accumulation of moist dirt is an indication of a leak.

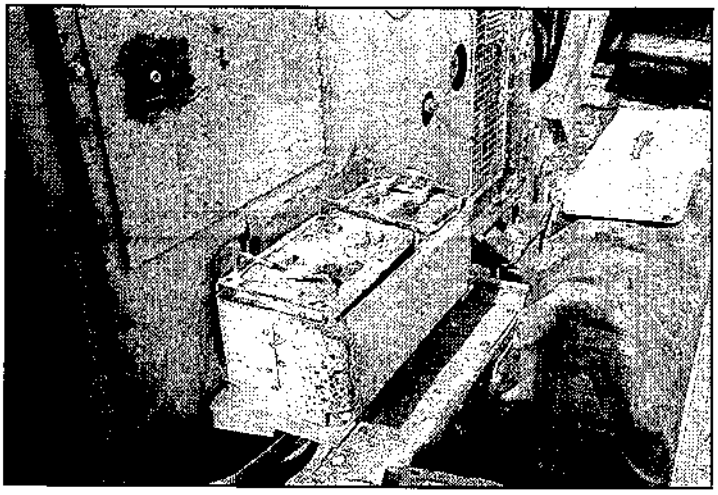
Keep the articulation area free of dirt, ice and snow. Accumulated debris can knock off the water pump elbow or damage the hood, cowling and hoses when the machine is articulated.



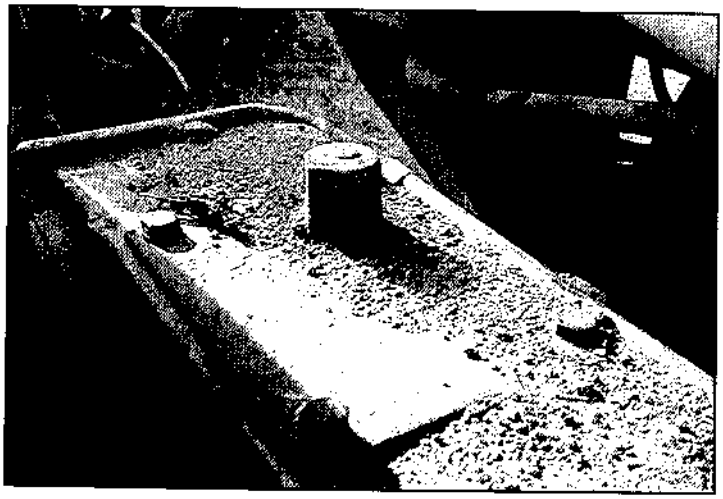
Be sure to replace the safety guard if you remove it to grease the drive shaft. The guard is there to protect you and your co-workers from injury.



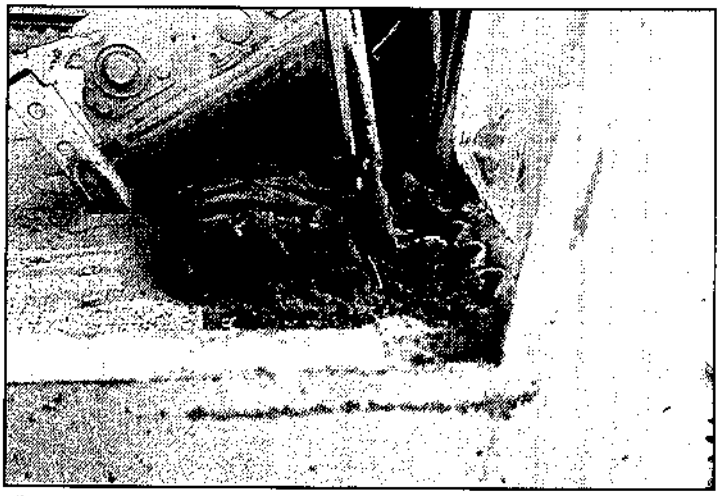
Battery cables that are in poor condition cannot carry the current needed to start the engine and are an electrical hazard. Replace immediately.



Keep the top of the batteries clean. Accumulated dirt attracts moisture, and this mixture can drain the battery's charge.



Keep the areas around all vent caps clean.



Prevent dirt from accumulating aroound the control valves. Valves in the condition shown above cannot operate properly. A clean machine reflects operator pride.

For More Information

For back issues of our newsletter and inserts, or to get on our mailing list, write: Alaska Transportation Technology Transfer Program, Department of Transportation and Public Facilities, 2301 Peger Road, M/S 2550, Fairbanks, Alaska 99709-5399. For more information, you can also call (907) 451-5320.

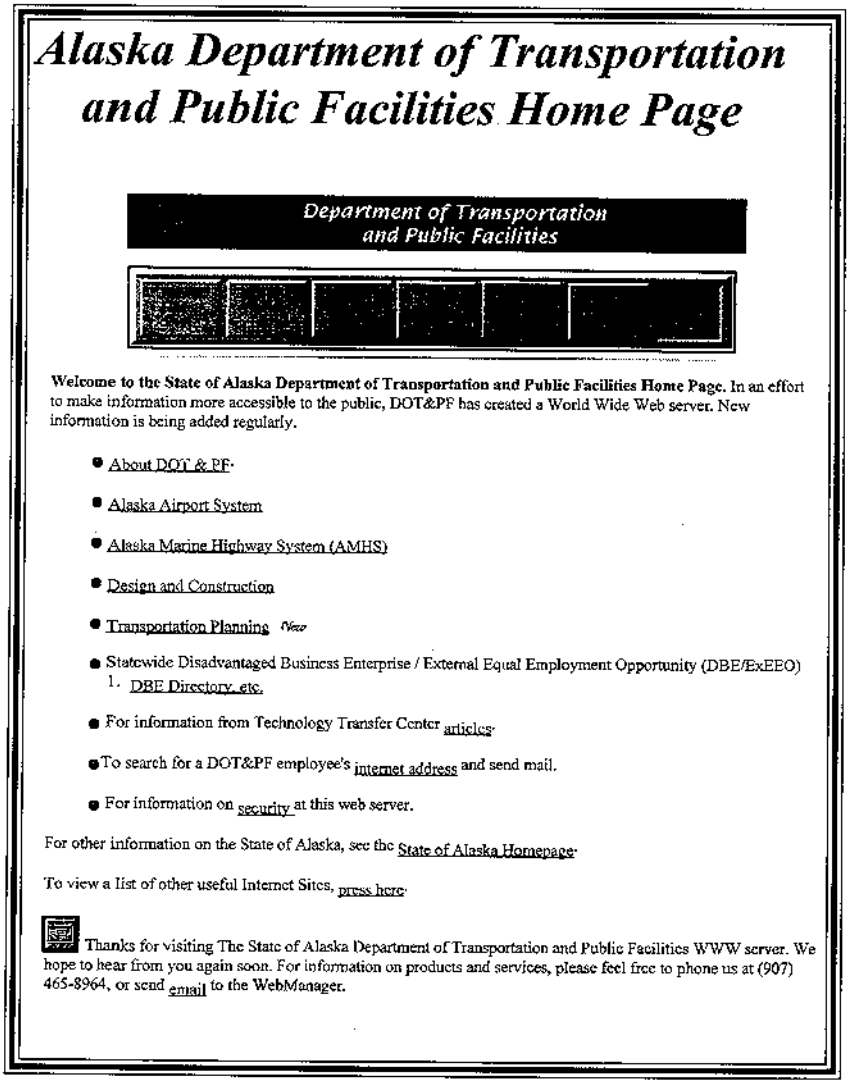
World Wide Web lets you 'surf' like a pro

The Internet is among the most common news items next to crime and politics. It has emerged as a vast source of information for those with the tools and knowledge to tap into it.

The World Wide Web (WWW) is one of the most user-friendly components of the Internet. It takes the user from the earlier text-based interface of the Internet to an easy-to-use graphics point and click interface. The WWW is now the most important, popular and fastest growing component of the Internet. For someone new to the cyberworld, it would appear that the WWW is what the Internet is all about.

Utilization of the WWW requires access to the Internet and the associated software. Internet access is available either from your organization or employer or from private internet access providers. Normally Internet access at work is provided as part of the Local Area Network (LAN). Homes can be connected via modem (at least 14.4 Kbps) to the access provider or through remote access to office resources. Once you have Internet access, you are connected and the software component is a minor issue. The Internet access provider, whether it be private or corporate, will be more than willing to give you information on how to get the software.

Both the Internet and the WWW are said to have ushered in the information age, but the terminology for the WWW is not as complicated as that of the Internet. One just needs to have basic computer knowledge and be familiar with a few terms. The WWW is simple enough for even a first timer to start having fun while cruising the Net.



Alaska Department of Transportation and Public Facilities Home Page

Department of Transportation and Public Facilities

Welcome to the State of Alaska Department of Transportation and Public Facilities Home Page. In an effort to make information more accessible to the public, DOT&PF has created a World Wide Web server. New information is being added regularly.

- About DOT & PF
- Alaska Airport System
- Alaska Marine Highway System (AMHS)
- Design and Construction
- Transportation Planning *New*
- Statewide Disadvantaged Business Enterprise / External Equal Employment Opportunity (DBE/ExEEO)
  1. DBE Directory, etc.
- For information from Technology Transfer Center articles
- To search for a DOT&PF employee's internet address and send mail.
- For information on security at this web server.

For other information on the State of Alaska, see the State of Alaska Homepage

To view a list of other useful Internet Sites, press here

Thanks for visiting The State of Alaska Department of Transportation and Public Facilities WWW server. We hope to hear from you again soon. For information on products and services, please feel free to phone us at (907) 465-8964, or send email to the WebManager.

The types of information and resources available on the WWW include corporate and government information sources, news and discussion groups, software repositories, interactive real-time talk sessions, tools to use the WWW, and multimedia (audio & video) files. The only thing a user needs to know to unlock these resources is the WWW address.

A WWW address is a pointer to a site where information is available and the organization or individual maintaining the site provides information for in most cases free public access. A site on the WWW is a location which has information, software and various types of digital information. A pointer or address is the equivalent of a mailing address. Just like there are no two places with the same mailing address, there are no two WWW sites with the same address or pointer. The WWW address is also called a link or a URL (Uniform Resource Locator). For example, the address for the US Department of Transportation of the WWW is "http://www.dot.gov"; the "http:// is an acronym for Hyper Text Transfer Protocol. The site of a certain organization, agency or individual is also referred to as their "Home Page."

Many organizations use the WWW for advertising, product information resources, white papers and corporate information or profiles. Government agencies provide information about their programs, activities, resources, per-

sonnel, services, facilities locations and information pertinent to their functions.

Government Home Pages

The Whitehouse-
http://www.whitehouse.gov/

U.S. DOT-
http://www.dot.gov/

Federal Emergency Management Agency-
http://www.fema.gov/

State of Alaska-
http://www.state.ak.us/

Alaska DOT-
http://www.dot.state.ak.us/

Many software and hardware manufacturers provide software via their Internet sites. Software repositories are not listed separately, but are part of the existing sites. Software such as device drivers, utilities and software patches (bug fixes) are all provided to users by organizations as part of technical support, product advertisement, etc.

Software/Hardware Info

IBM Corp.
http://www.ibm.com/

Apple Computer Corp.
http://www.apple.com/

Microsoft Corp.
http://www.microsoft.com/

Adobe Systems Inc.
http://www.adobe.com/

The discussion and news groups are a legacy of the text-based Internet. These groups are rich sources of information on any subject. The news groups consist of articles on a vast range of topics. Discussion groups are where people exchange experiences and viewpoints on a variety of issues. There are about 4,527 news and discussion groups, and the best way to learn about them is to read a few of them.

Newsgroups

Transportation News
news:clari.biz.industry.transportation
Manufacturing News
news:clari.biz.industry.manufacturing

Interactive real-time talk sessions are areas where users can "talk" with one another in on-line social gatherings. These talks occur as users send messages to each other within a matter of seconds of one another's responses. These sites only require a friendly personality and relatively quick typing skills.

Talk Sites

Fun City WWW Chat
http://www.funcity.com/talk/

The Cyber Talker
http://talker.pan-net.de/

L'Hotel Chat
http://www.magmacom.com/~cbjustus/lhotel/hotel.html

There are many search tools on the WWW to help users find information. The tools will bring up information based on a search for a keyword, title, or subject.

Search Tools

Infoseek Search Tool
http://www2.infoseek.com/

Lycos Internet Catalog
http://lycos.cs.cmu.edu/

WebCrawler Searching
http://webcrawler.com

The WWW has evoked the interest of the masses and has caught the imagination of many entrepreneurs. The number of product designed to use the WWW are increasing daily. The latest additions allow for secure financial transactions through the WWW, send and receive e-mail, download software executables, in-line graphics, and multimedia, to list but a few.

The WWW is one place where a person can find information on virtually anything. From on-line shopping to in-depth research, the WWW provides a seemingly never-ending supply of information.

Although there is a variety of publications designed to teach a person how to use the WWW, it can only be truly appreciated through use. Any amount of reading about the WWW can never beat the experience of being able to cruise the Net.

Adapted with permission from Tropical Transfer, *Fall 1995.*

Attention! We need your input, info and experience

Next issue's computer notes will focus on PC operating systems, specifically Windows 3.1, Windows NT, Windows 95, and OS/2 Warp. Along with some technical information, we hope to include some of your experiences, whether they be good, bad, or humorous. If you have an anecdote, helpful hint, coping strategy, or even a not-so-helpful hint about any of the PC operating systems, please send it to the address below, fax it to (907) 452-2313, or e-mail to Marmian_Denton@dot.state.ak.us. Please include your name and a number where you can be reached. Contact Marmian at 452-5321 if you have any questions.

For More Information

For back issues of our newsletter and inserts, or to get on our mailing list, write: Alaska Transportation Technology Transfer Program, Department of Transportation and Public Facilities, 2301 Peger Road, M/S 2550, Fairbanks, Alaska 99709-5399. For more information, you can also call (907) 451-5320.

UAF AISES chapter nationally recognized

The University of Alaska Fairbanks chapter of the American Indian Science and Engineering Society (AISES) received the 1995-96 runner-up Stelvio J. Zanin Distinguished Chapter Award and a $500 prize at the 17th annual AISES National Conference.

The UAF AISES chapter selected nine students to attend the national conference held in Detroit, Michigan. The UAF delegates were: Beverly Johnson of Emmonak, a senior in biochemistry; Mark L.M. Blair, originally of Detroit and recently Kotzebue, an anthropology graduate student; Kimberly O'Connor of Nome, a senior in education; John Henry of Stebbins, a senior in electrical engineering; Patrick Snow of McGrath, a junior in wildlife management; Mike Orr of Bethel, a junior in resource economics; Ann Shane originally of St. Paul Island, a junior in electrical engineering; Dennis Jimmie of Kwigillingok, a senior in electrical engineering; and Aaron Kasgnoc of Fairbanks, a junior in mechanical engineering.

Photo courtesy of UAF AISES

UAF AISES members (from left) Mark Blair, Patrick Snow, Mike Orr, Aaron Kasgnoc, Beverly Johnson, John Henry, Ann Shane, Sheri Schuyler (UAF Institute of Marine Science), Kimberly O'Connor and Dennis Jimmie pose for a group photo at the AISES National Convention in Detroit.

Of the 127 college chapters in the United States and Canada, UAF has been repeatedly recognized for its outstanding accomplishments. At the AISES national conference in San Jose, California last year, UAF was named the 1994 Stelvio J. Zanin Distinguished Chapter of the Year. In the past, the UAF chapter has been home to many scholarship recipients. This year Ann Shane, John Henry and Beverly Johnson received an A.T. Anderson Memorial Scholarship. The chapter was also pleased when Mark Blair was voted as the alternate AISES national representative for the northwestern United States (AK, WA, OR, ID, MT).

Established in 1977, the American Indian Science and Engineering Society is a nationwide nonprofit organization that strives to increase the number of Alaska Native/American Indian students graduating with college degrees in engineering, math, natural sciences, medicine, computer science, and education with an emphasis on math or science. The underlying goal is to stress the importance of both education and culture for all Native Americans, guided by a council of elders.

The annual conference holds a multitude of opportunities from sharing knowledge about new technologies to talking to prospective employers about an internship or permanent job, and yet serves as a spiritual motivator to remain focused on academic goals and later enrich the science and engineering communities. The yearly gathering brings together Native American college students, high school students, educators and professionals along with corporations, government agencies, tribal enterprises, and universities and colleges. It is the focal point for all AISES programs and activities.

The UAF AISES chapter meets every two weeks throughout the school year and hosts workshops and guest speakers from a variety of fields. Chapter goals for the 1996 spring semester include retaining and increasing membership, producing a chapter information pamphlet for new students, organizing the chapter to become more efficient, representing UAF at the AISES Regional One and Leadership Conferences in March, and increasing the time committed to community service projects.

The UAF chapter members gratefully acknowledge the generous sponsors that made travel possible to attend the AISES National Conference in Detroit - The Alaska Department of Transporation T2 program, AT&T Bell Laboratories, Bering Straits Native Corporation, Doyon, Calista, Sitnasauk Native Corporation, Alaska Biological Research, UAF College of Natural Sciences, UAF Institute of Marine Sciences, Rural Alaska Honors Institute, Jon Zarling, Loftus Engineering, and Lake & Boswell Engineering. Thank you.

Alaska Transportation Week

April 15-19, 1996

Sheraton Hotel

Anchorage, Alaska

Meet with other transportation professionals in seminars and discussion groups led by experts on today's top issues in transportation.

✓ Winter Maintenance and New Technologies

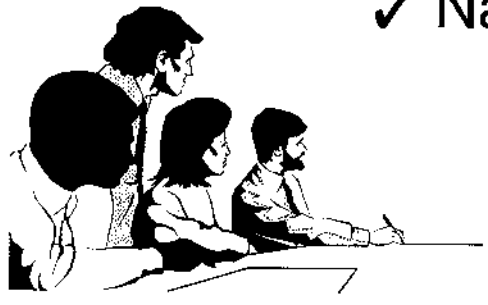
✓ Current Alaskan Transportation Research

✓ National Quality Initiative

✓ Value Engineering

✓ Asphalt Issues

✓ Partnering



Featured Speakers:

Peter Wert, vice president, AGC

James W. van Loeben Sels, P.E., director, CalTrans, & vice chair, TRB

Contact the Alaska Technology Transfer Center at (907) 451-5320 for more information

Sponsored by: Federal Highway Administration, Alaska Department of Transportation & Public Facilities, UAF Transportation Research Center, and Associated General Contractors

NQI places emphasis on 'prevention'

This is a continuation of the article featured in the previous issue.

In the process of developing an appreciation for the benefits of Continuous Quality Improvement, the manager who is "testing the waters" requires a working knowledge of its theoretical roots, its successful application and some of the process tools available. These elements have been treated extensively in the quality literature, most notably by quality pioneers W. Edwards Deming, Joseph Juran and Philip Crosby. Many disciples of these "centers of profound knowledge" for quality are continuing to extend and refine the legacies of these pioneers.

Although there are discrete features of the quality philosophies of each of the pioneers and their disciples, the similarities dominate and there is complete agreement that successful application of Continuous Quality Improvement most assuredly requires a change in the existing organizational culture of the adopting agency or business. Often referred to as paradigm shifts, these cultural changes characterize both the opportunities and developmental challenges for successful implementation of a quality environment.

Paradigm Shifts

From		To
Cost/Schedule	→	*Quality First*
Internal Standards	→	*Customer Focus*
Fixing	→	*Preventing*
Management By Experience and Intuition	→	*Management By Facts*
Step Function Improvement	→	*Continuous Improvement*
Self-Focus	→	*Mutual Respect*
Competition	→	*Teamwork*

Of all the tenets of Continuous Quality Improvement, perhaps the two most important are "quality first" and "customer focus," since the correct definition of quality is not just some vague expression of goodness, but in fact is precisely defined as "meeting the customer's requirements/expectations." Looking inside the current culture of those providing highway facilities, it is not hard to find practices which are driven by low first cost or internal accounting processes which can obstruct efforts to meet customer requirements as well as to address the expectations of the ultimate highway user customer.

The additional objective of productively meeting these customer's requirements the first time, every time, as a matter of policy imposes a special discipline on organizations and their processes. The potential for failure in meeting customer requirements usually indicates a need for product inspection or appraisal prior to delivery in order to be able to "fix" the problem before the customer experiences the effect of non-conformance. Common to the highway industry, this inspection may result in subsequent rework, grinding, backcharges or other examples of the cost of non-conformance to requirements.

Prevention measures instituted/employed to anticipate the problems revealed by inspection are almost universally less costly than fixing them later. One of the keys to successfully applying quality management principles is to audit current practices in order to ascertain the "costs of quality." These include the costs of failure (non-conformance), the costs of inspection and the costs of prevention. For example, a one-digit error in a bridge abutment dimension, not caught by a steel fabricator (through inspection), results in huge contractor delay in erection, necessary redesign to match up the bridge elements, long litigation to fix the blame, etc. (i.e. failure). Even a large cost in prevention of the error is minuscule compared to the cost of its ultimate consequences.

Since the quality paradigm characterizes a shift from fixing to prevention, one may say (as does the quality guru Philip Crosby) that quality is free, based on the failure costs avoided. However, the cost of prevention is not zero. It involves dollars and time for training, for implementing, and for exercising the quality management process. Patience is required as well, since results of any investment in prevention are usually not instantaneous.

In an effective quality environment, prevention would lessen the costs required for inspection. Because the consequences of poor quality in highway facility development

may be catastrophic, inspection is a continuing requirement. Indeed it is commonly seen early in the quality improvement process that an increase in inspection effort seems to be associated with higher levels of non-conformance. This anomaly occurs because improved appraisal systems identify more of the flaws which might have otherwise slipped through without ever becoming obvious.

In summary, a major objective of Continuous Quality Improvement is to lower the cost of non-conformance through inspection before delivery and, most effectively, by prevention of problems and defects before they occur.

One of the most difficult aspects of a culture shift to a quality environment is the institutional heritage of "that's the way we've always done it" reflecting a "management by experience and intuition" approach to problem solving. One has but to consider the erosion of strictly engineering considerations in the face of evolving environmental and social concerns to realize that experience and intuition - "gut" feelings about the way things are - are no longer sufficient justifications for action.

A review of any well crafted environmental impact statement for an improved highway facility will reveal that "Management by Facts" is essential as the new paradigm in order to actually be allowed to construct facilities which have been planned. The tools, which will be described in later issues, constitute excellent means to document decision-support activities and are invaluable in the deployment and employee empowerment aspects of any Continuous Quality Improvement initiative. These tools, if used properly, provide a way to reflect facts which describe the actual operation of appropriate processes and point out exceptions which offer opportunities or warn of future trouble.

In complex operational systems (such as highway maintenance), with many interdependent parts, the use of these tools will usually help avoid "hunt and peck" fixes to product or process failures in favor of statistically based improvements.

Continuous Quality Improvement, the subject of this guide endorsed by the National Quality Initiative, reflects a new paradigm with specific rules common to virtually all those embarking upon quality journeys.

Under the old paradigm, process improvements are associated with big, costly, manifest changes in the way business is done. The may be regarded as "step functions." The acquisition of new mainframe computer hardware and software systems or a truck mounted snooper for bridge inspection or a comprehensive GPS receiver system are examples. In these examples, the expectation for improvement relies primarily on the technology acquired and in some cases this technology may constitute simply a "shiny new wrench" looking for the right bolt to tighten.

Under the new paradigm associated with Continuous Quality Improvement, the improvement process itself suggests the optimum and effective step-function improvement required, together with the associated human resource development needed. In this new paradigm, we switch to "buyers" (customer) focus where the Continuous Quality Improvement process incorporates the appropriate technology rather than being driven by it. The result is a synergy of step-functions and continuous improvements.

One of the essential elements in a culture change which accommodates quality is the nature of interpersonal relations between the parties responsible for success. Indeed, the partnering concept requires a migration away from self-focus and the single interests of individuals or organizations and toward an environment of mutual respect. Mutual respect is based on the professional equivalence to the parties, drawn from a set of shared values such as integrity, fairness and consistency. Without mutual respect the system is dominated by suspicion and even litigation. Partnering has been developed in part to bridge the gap between self-focus and mutual respect.

Closely related and also required for effective partnering is a paradigm shift from competition to teamwork. Given the traditions of our national culture, competition is greatly honored and rewarded, and it is not the purpose of this document to denigrate it. The fact is that competition internal to the process of delivering a highway product can and often does lead to lower first cost of a facility. However, narrow competition within the approved and contracted process can be harmful to the quality of the final product if it prevents teamwork.

In summary, Continuous Quality Improvement will be most successful if all parties keep their efforts focused on the requirements and expectations of the ultimate customer - the highway facility user. Continuous Quality Improvement requires consideration of the entire "cost of quality" and must assure that decisions are based on measurements and facts rather than hunches about what seemed to have worked in the past.

Continuous Quality Improvement should focus on whole systems of application, including people, when employing step-function improvements through technology.

Finally, the inviting concept of partnering is now emerging to guide much more effective and efficient planning, design, construction and operation of highway facilities. Its success is to a large extent dependent upon realization of mutual respect among the parties and adherence to the best practices of teamwork in order to reach the objectives of all the partners.

Excerpted and abridged from "Quality Improvement Resource Guide," *Federal Highway Administration publication No. FHWA-SA-94-002, October 1993.*

For More Information

For back issues of our newsletter and inserts, or to get on our mailing list, write: Alaska Transportation Technology Transfer Program, Department of Transportation and Public Facilities, 2301 Peger Road, M/S 2550, Fairbanks, Alaska 99709-5399. For more information, you can also call (907) 451-5320.

New Publications Available for Loan 1995

No. 41

Please check the publications that you wish to borrow.

____ **Accelerated Performance-Related Tests for Asphalt-Aggregate Mixes and Their Use in Mix Design and Analysis Systems**, ID-1390, Strategic Highway Research Program, National Research Council, SHRP-A-417, 1994, 168pp.

____ **Cathodic Protection Developments for Prestressed Concrete Components**, ID-1392, U.S.DOT, Federal Highway Administration, FHWA-RD-94-001, 1994, 132pp.

____ **Congestion Management Systems-State-Of-The-Practice Review**, ID-1406, TTI:9-563, Research Report 563-1F, Texas Transportation Institute, Texas Department of Transportation, FHWA/TX-94/563-1F, August 1993, 268pp.

____ **Controlling Nonpoint Source Runoff Pollution form Roads, Highways, and Bridges**, ID-1409, EPA 841-F-95-008a, United States Environmental Protection Agency, Office of Water (4503F), August 1995, 6pp.

____ **The Costs of Highway Crashes**, ID-1396, U.S. D.O.T., Federal Highway Administration, FHWA-RD-91-055, 1991, 152pp.

____ **Design of Riprap Revetment**, ID-1391, U.S. Dept. of Commerce, National Technical Information Service, FHWA-IP-89-016, HEC-11, 1989, 168pp.

____ **Development of a Procedure to Rate the Application of Pavement Maintenance Treatments**, ID-1395, Strategic Highway Research, National Research Council, SHRP-M/FR-92-102, SHRP-H-322, 1992, 65pp.

____ **Development of Analytical Tools for Evaluating Operations of Light Rail At Grade Within an Urban Signal System - Final Report**, ID-1414, FHWA/TX-94/1278-4F, TTI: 0-1278, Research Report 1278-4F, Texas Transportation Institute, Texas Department of Transportation, November 1994, 62pp.

____ **Development of Roadside Safety Data Collection Plan**, ID-1401, U.S.D.O.T., Federal Highway Administration, FHWA-RD-92-113, 1994, 91pp.

____ **Disposal of Hazardous Materials from TxDOT Activities**, ID-1415, FHWA/TX-94/1318-1F, TTI: 0-1318, Research Report 1318-1F, Texas Transportation Institute, Texas Department of Transportation, November 1994, 40pp.

____ **Distance Requirements for Ramp Metering**, ID-1413, FHWA/TX-95/1392-5, TTI: 0-1392, Research Report 1392-5, Texas Transportation Institute, Texas Department of Transportation, November 1994, 38pp.

____ **A Framework for Evaluating Multimodal Transportation Investment in Texas**, ID-1411, CTR 0-1282-2F, Research Report 1282-2F, Project 0-1282, Center for Transportation Research, The University of Texas at Austin, May 1994, 286pp.

____ **Guidelines for Signalized Left Turn Treatments**, ID-1408, FHWA-IP-81-4, USDOT/FHWA, November 1981, 37pp.

____ **Hardware/Software Compatibility for Traffic Management/IVHS Systems**, ID-1405, TTI:0-1232, Research Report 1232-26, Texas Transportation Institute, Texas Department of Transportation, FHWA/TX-94/1232-26, November 1994, 156pp.

____ **Highway Maintenance Procedures Dealing with Hazardous Material Incidents, A Synthesis of Highway Practice**, ID-1393, NCHRP Synthesis 196, Transportation Research Board, National Research Council, NCHRP Synthesis 196, 1994, 59pp.

____ **Level One Mix Design: Materials Selection, Compaction, and Conditioning**, ID-1387, Strategic Highway Research Program, National Research Council, SHRP-A-408, 1994, 127pp.

____ **A Method for Estimating the Remaining Life of Continuously Reinforced Concrete Pavements**, ID-1412, FHWA/TX-95+1244-12, CTR 0-1244-12, Research Report 1244-12, Project 0-1244, Center for Transportation Research, The University of Texas at Austin, November 1994, 67pp.

____ **Model Stormwater Drainage and Detention Ordinance**, A Guide for Local Officials, ID-1398, Northeastern Illinois Planning Commission, 1990, 34pp.

____ **The National Bicycling and Walking Study: Transportation Choices for a Changing America, Final Report**, ID-1404, USDOT/FHWA, FHWA-PD-94-023, 1994, 132pp.

____**Permanent Deformation Response of Asphalt Aggregate Mixes**, ID-1389, Strategic Highway Research Program, National Research Council, SHRP-A-415, 1994, 457pp.

____ **Polymerized Crumb Rubber Modified Mixtures in Minnesota**, ID-1385, Minnesota D.O.T., MN\RC-94\08, 1994, 181pp.

____ **Polymerized Crumb Rubber Modified Mixtures in Minnesota**, ID-1399, Minnesota D.O.T., MN/RC-94/08, 1993, 181pp.

____**Revision 1 to the Texas Highway Operations Manual**, ID-1410, FHWA/TX-94/1232-3, Revision 1, Texas Transportation Institute, Texas Department of Transportation, September 1994, 118pp.

____ **Role of Highway Maintenance in Integrated Management Systems**, ID-1400, NCHRP Report 363, Transportation Research Board, National Research Council, NCHRP 363, 1994, 131pp.

____**Safety Improvements on Horizonal Curves for Two-Lane Rural Roads--Informational Guide**, ID-1397, U.S. D.O.T., Federal Highway Administration, FHWA-RD-90-074, 1991, 99pp.

____**State of the Practice-Design and Construction of Asphalt Paving Materials with Crumb Rubber Modifier**, ID-1386, Federal Highway Administration, U. S. Dept. of Commerce, National Technical Information Service, FHWA-SA-92-022, 1992, 118pp.

____ **Status of Research on Development Length of Prestressing Strand for Prestressed Concrete, Update**, ID-1403, Office of Engineering and Highway Operations Research and Development, Federal Highway Administration, 1993, 6pp.

____ **A Study of Benefits, Accomplishments, and Resource Needs of the Local Technical Assistance Program**, ID-1402, U.S.D.O.T., Federal Highway Administration, FHWA-SA-94-037, 1994, 41pp.

____ **Texas Highway-Rail Intersection Field Reference Guide**, ID-1407, TTI:0-1273, Research Report 1273-2F, Texas Transportation Institute, Texas Department of Transportation, FHWA/TX-94/1273-2F, May 1994, 164pp.

____ **Uses of Recycled Rubber Tires in Highways, A Synthesis of Highway Practice**, ID-1394, Transportation Research Board, National Research Council, NCHRP Synthesis 198, 1994, 162pp.

____**Validation of Relationships Between Specification Properties and Performance**, ID-1388, Strategic Highway Research Program, National Research Council, SHRP-A-409, 1994, 110pp.

These publications may be borrowed for three weeks. However, if you need the materials longer, just contact our office for an extension. Questions? Contact **Susan Earp** at (907) 451-5320 or TDD: (907) 451-2363.

Please print your name and address below, and mail or fax to:

Alaska Transportation Technology Transfer Program
Local Technical Assistance Program (LTAP)
Department of Transportation and Public Facilities
2301 Peger Road M/S 2550
Fairbanks, AK 99709-5399
FAX: (907) 451-2313

Name: _____ **Title:** _____ **M/S:** _____
Organization: _____
Address: _____
City: _____ **State/Province:** _____ **Zip:** _____
Phone: _____ **Fax:** _____

For More Information

For back issues of our newsletter and inserts, or to get on our mailing list, write: Alaska Transportation Technology Transfer Program, Department of Transportation and Public Facilities, 2301 Peger Road, M/S 2550, Fairbanks, Alaska 99709-5399. For more information, you can also call (907) 451-5320.

New Videos Available for Loan 1995

No. 41

Please check the publications/videos that you wish to borrow.

____ **OECD: Good Neighbors in a Changing World: Technology Transfer**, ID-303, 20 min., 1995.

____ **Subsurface Utility Engineering - A Proven Solution**, ID-302, Federal Highway Administration, 16:21 min., 1995.

____ **Wetlands Mitigation for Transportation Projects**, ID-304, 4 hrs., October 26, 1995. Satellite broadcast workshop.

ADDITIONAL PUBLICATIONS AVAILABLE FOR LOAN

____ **Analysis of Jointed Concrete Pavement**, ID-1419, FHWA/TX-95+1244-10, CTR 0-1244-10, Research Report 1244-10, Project 0-1244, Center for Transportation Research, The University of Texas at Austin, December 1994, 104pp.

____ **An Annotated Bibliography of Transportation-Related Air Quality Documents: 1989-1994**, ID-1422, FHWA/TX-95/1279-8, TTI: 0-1279, Research Report 1279-8, Texas Transportation Institute, Texas Department of Transportation, February 1995, 201pp.

____ **Dynamic Response - Tied Arch Bridges**, ID-1430, U.S. 59 Houston, Research Study No: 7-1982-1, Texas Technical University, Texas Department of Transportation, February 1994, 69pp.

____ **Evaluation of Flexible Pavements and Subgrades Using the Spectral-Analysis-of-Surface-Waves (SASW) Method**, ID-1432, FHWA/TX-95+1175-7F, CTR 2/3-18-88/1-1175-7F, Research Report 1175-7F, Project 2/3-18-88/1-1175, Center for Transportation Research, The University of Texas at Austin, August 1993, 283pp.

____ **Fatigue Properties of Rubber Modified Pavements: Final Report**, ID-1433, INE/TRC 94.25, SPR-UAF-93-09B, Institute of Northern Engineering, Alaska Department of Transportation and Public Facilities, May 1995, 202pp.

____ **Guidelines for Field Evaluations of Pothole Repairs**, ID-1425, CERF Report: HITEC 95-1, Product 01, 44pp.

____ **Highway Safety Performance - 1992: Fatal and Injury Accident Rates on Public Roads in the United States**, ID-1428, FHWA-SA-95-030, USDOT/FHWA, January 1992, 87pp.

____ **Identification of Transportation Planning Data Requirements in Federal Legislation: Final Report**, ID-1431, DOT-T-94-21, USDOT/FHWA/FTA/Office of the Secretary and US EPA, Technology Sharing Program, Travel Model Improvement Program, July 1994, 97pp.

____ **Improving the Sulfate Resistance of Fly-Ash Concrete, Summary Report 481-8(S)**, ID-1426, July 1995, Departmental Information Exchange, CTR, Texas Department of Transportation, Office of Research and Technology Transfer, 1pp.

____ **Influence of Roundup® with Adjuvants and Other Herbicides for Control of Roadside Bermudagrass**, ID-1415, TX-94/902-11, TTI: 7-902, Research Report 902-11, Texas TransportationInstitute, Texas Department of Transportation, January 1995, 40pp.

____ **Injury Control in the 1990s: A National Plan for Action: A Report to The Second World Conference On Injury Control**, ID-1429, Association for the Advancement of Automotive Medicine, May 1993, 62pp.

____ **Nye regler for sikring av overdekning: Spesifikasjoner for sikring av armeringens overdekning**, ID-1424, Publikasjon nr. 78, Veglaboratoriet, Statens vegvesen, Vegdirektoratet, 40pp.

____ **Overload Permit Procedures**, ID-1434, FHWA/TX-94/1266-4F, TTI: 0-1266, Research Report 1266-4F, Texas Transportation Institute, Texas Department of Transportation, February 1994, July 1994, 218pp.

____ **Performance and Operational Experience of Crash Cushions: A Synthesis of Highway Practice**, ID-1437, NCHRP Synthesis 205, Transportation Research Board, National Research Council, 1994, 87pp.

____ **Physical and Access/Locational Characteristics of Remainders of Partial Takings Significantly Affecting Right-Of-Way Costs**, ID-1427, FHWA/TX-94/1390-1, TTI: 0-1390, Research Report 1390-1, Texas Transportation Institute, Texas Department of Transportation, October 1994, 84pp.

____ **Public Roads**, ID-1417, Summer 1995, Volume 59, Number 1, USDOT/FHWA

____ **Public Roads**, ID-1418, Winter 1995, Volume 58, Number 3, UDOT/FHWA

____ **Safety Management System: Participant Workbook**, ID-1439, FHWA-HI-95-012, USDOT/FHWA, NHI Course No. 38062, February 1995, 104pp.

____ **Safety Management System: Reference Manual**, ID-1438, FHWA-HI-95-014, USDOT/FHWA, NHI Course No. 38062, January 1995, 82pp.

____ **Sealers For Portland Cement Concrete Highway Facilities: A Synthesis of Highway Practice**, ID-1436, NCHRP Synthesis 209, Transportation Research Board, National Research Council, 1994, 85pp.

____ **Temporary Erosion Control Measures Design Guidelines for TxDOT**, ID-1435, FHWA/TX-95/1379-1, TTI: 0-1379, Research Report 1379-1, Texas Transportation Institute, Texas Department of Transportation and Public Facilities, November 1994, 114pp.

____ **Texas Public Opinion Regarding Toll Roads**, ID-1420, FHWA/TX-95+1322-1, CTR 0-1322, Research Report 1322-1, Project 0-1322, Center for Transportation Research, The University of Texas at Austin, March 1995, 92pp.

____ **Toll Facilities in the United States: Bridges-Roads-Tunnels-Ferries**, ID-1416, FHWA-PL-95-034, USDOT/FHWA, February 1995, 28pp.

____ **The Use and Effects of Studded Tires on Oregon Pavements**, ID-1421, by Bruce E. Brunette, Department of Civil Engineering, Oregon State University, May 1995, 160pp.

____ **Verification of an Asphalt Aging Test and Development of Superior Recycling Agents and Asphalts**, ID-1423, FHWA/TX-94/1314-1F, TTI: 0-1314, Research Report 1314-1F, Texas Transportation Institute, Texas Department of Transportation, November 1994, 356pp.

These videotapes and publications may be borrowed for three weeks. However, if you need the materials longer, just contact our office for an extension. Questions? Contact **Susan Earp** at (907) 451-5320 or TDD: (907) 451-2363.

Please print your name and address below, and mail or fax to:

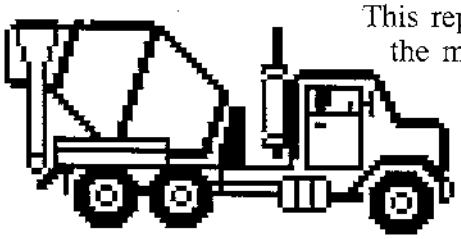
Alaska Transportation Technology Transfer Program
Local Technical Assistance Program (LTAP)
Department of Transportation and Public Facilities
2301 Peger Road M/S 2550
Fairbanks, AK 99709-5399
FAX: (907) 451-2313

Name: _____ **Title:** _____ **M/S:** _____
Organization: _____
Address: _____
City: _____ **State/Province:** _____ **Zip:** _____
Phone: _____ **Fax:** _____

For More Information

For back issues of our newsletter and inserts, or to get on our mailing list, write: Alaska Transportation Technology Transfer Program, Department of Transportation and Public Facilities, 2301 Peger Road, M/S 2550, Fairbanks, Alaska 99709-5399. For more information, you can also call (907) 451-5320.

Solidification/Stabilization of Used Abrasive Media for Non-Structural Concrete Using Portland Cement, *FHWA/TX-95/1315-2, M.T. Webster, R.L. Carrasquillo, R.C. Loehr and D.W. Fowler.*



This report discusses how the media used to blast old paint off of bridge structures may be reused in some instances. The blast media, which in some cases may qualify as toxic waste, is stabilized and used in portland cement-based concrete. This report also tests the long term leaching of the contaminants in the media into the soil.

Effectiveness of Breaking and Seating of Reinforced PCC Pavements Before Overlay, *FHWA/OH-95/023, Issam Minkarah and Rajagopal Arudi.*

This study looks into the effects that the type of breaking equipment and the extent of the breaking have on the performance of break and seat sections with an AC surface layer.

Effect of Aggregates on Pavement Peformance, *FHWA/TX-94/1244-13F, B. Frank McCullough, Dan G. Zollinger and Terry Dossey.*

In Texas, rigid and flexible pavements are most often constructed using crushed limestone and/or siliceous river gravel as the course aggregate. Project 1244, sponsored by the Texas Department of Transportation (TxDOT), evaluated the performance of rigid pavements and flexible pavements made with siliceous river gravel and with crushed limestone as coarse aggregates, in order to develop specifications that obtain equal and adequate performance from the different aggregates.

VTI Sartryk - Road Traffic Noise Abatement by Emission of Pleasant Sound? *No. 247, 1995.*

This paper discusses the current use of devices that emit pleasant sounds to offset the noise from road traffic. Also included are suggestions for possible future applications of this method.

Evaluation of Micro-Surfacing Mixture Design Procedures and the Effects of Material Variation Test Responses, *FHWA/TX-95/1289-1, E.M. Andrews, R.E. Smith, C.K. Beatty and J.W. Button.*

This study examined the repeatability of the International Slurry Surfacing Association (ISSA) mixture design tests by evaluating the variability of the test results obtained. Consistencies between material combinations and within a given material formulation were evaluated. The repeatability of the tests using materials falling within current micro-surfacing specifications was obtained. Material compositions were varied, and the responses for the various tests were examined to identify any definite trends. This process revealed more about the behavior of materials used in typical micro-surfacing mixtures. The establishment of the repeatability of these tests and the observation of the impact of material variation is an initial investigation that provides a foundation for future micro-surfacing research.

Assessment of Congestion Pricing for Reducing Urban Congestion and Improving Air Quality, *FHWA/TX-95/1321-1F, Jorge Acha-Daza, Raymond Moore and Hani S. Mahmassani.*

The principle goal of this study is to provide engineers and officials with information and approaches that would assist in: 1) determining the potential of road pricing for urban congestion control, air quality enhancement,and revenue generation; and 2) developing a strategy for possible implementation of road pricing.

Measurement and Analysis of Traffic Loads Across the Texas-Mexico Border, *FHWA/TX-95/1319-1, Joseph Paul Leidy, Clyde E. Lee and Robert Harrison.*

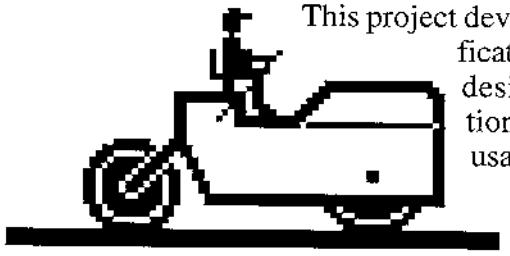
This study examines the potential damage to highways by international trade traffic as a result of the U.S.-Mexico Free Trade Agreement. Concerns include an increase volume of trade-related truck traffic, and therefore an increased wear and tear on the roadways, and also weight of the loads carried by the Mexico-origin trucks.

Road Use Estimator Systems for Low Volume Roads, *9477 1205-SDTDC, Fred Cammack, P.E.*

A survey of Forest needs is followed by a report of field testing conducted on the Nu-Metrics HISTAR 90 Traffic Counter. In the following sections is a recommended equipment selection criteria and a survey of potential replacement systems. The use of digital photography and video technology is emphasized in the survey of potential replacement systems. Also discussed is an evaluation of the Nu-Metrics NC-30

Count Card conducted by the Technology and Development Center. Closing remarks include recommendations for future development.

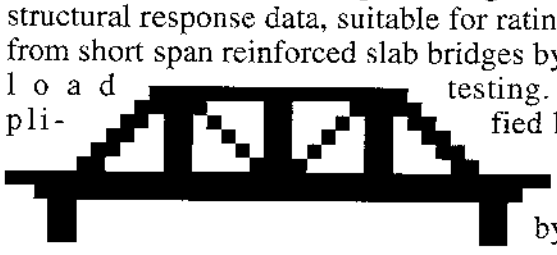
Use of Micro-Surfacing in Highway Pavements, *FHWA/TX-95/1289-2F, R.E. Smith, C.K. Beatty, J.W. Button, S.E. Stacy and E.M. Andrews.*



This project developed specifications, mixture design verification procedures, usage guidelines and quality assurance requirements for micro-surfacing treatments applied to highway pavements. The mixture design procedure tests were evaluated in the laboratory and modified as needed. Detailed protocols were developed for each test. Micro-surfacing mixture designs and quality assurance procedures were tested in the field. Quality assurance checklists were developed for use by field personnel. This report presents a method for evaluating cost effectiveness along with preliminary results. An approach for completing forensic analysis of early failures was also prepared.

Feasibility Study for Simplified Load Testing of Slab Bridges, *FHWA/OH-95/024, Arthur J. Huckelbridge, Jr.*

The objective of this investigation is to demostrate the feasibility of obtaining meaningful quantitative structural response data, suitable for rating purposes, from short span reinforced slab bridges by simplified load testing. Such simplified load testing could be carried out by regular inspection personnel, utilizing pre-weighed vehicles for loading the structures and collecting the resulting deflection data with readily available instrumentation, such as mechanical dial gages, etc. Quantitative in-situ load performance data, combined with conventional visual inspection, would provide a much sounder basis for load rating than visual inspection alone. Before such a rating procedure can be developed, however, it must be verified that useful data can be collected by the "low-tech" instrumentation alluded to.



Evaluation of Remedial Measures for Embankment Failures, *FHWA/OH-95/019, Tien H. Wu.*

Two remedial measures were used to repair slope failures on clay embankments. The first measure used geotextile-reinforced, soil-aggregate mix as a surface layer. The second measure used black locust seedlings planted on the rebuilt slope. A field investigation was carried out to determine the performance of the remedial measures. This report contains the results of this investigation.

Guidelines on the Use of RAP in Routine Maintenance Activities, *1272-2F, Cindy K. Estakhri and John Bohuslav.*

This document presents guidelines on the use of RAP in routine maintenance activities. Topics covered include: proper procedures for collecting and stockpiling RAP; an outline of cold-mix design procedures and field tests to aid in determining appropriate recycling agent quantities; field processing procedures to improve the quality of RAP for maintenance mixtures; and appropriate uses of RAP and treated RAP in routine maintenance activities.

FHWA Study Tour for Highway Safety Management Practices in Japan, Australia and New Zealand, *FHWA-PL-95-045, J. Bared, S.B. Petty, N. Evans, F.F. Small, R.W. Hill and J.J. Zogby.*

This report highlights the findings of a U.S. study team that examined safety management practices in Japan, Australia and New Zealand. The team met with a variety of officials who were responsible for or involved in major highway safety activities in their countries. The information gathered by this team was analyzed and possible applications in the U.S. were examined.

The publications listed are avilable for loan from the Alaska T2 Program library. To borrow any of the materials listed, contact Susan Earp at (907) 451-5320.

For More Information

For back issues of our newsletter and inserts, or to get on our mailing list, write: Alaska Transportation Technology Transfer Program, Department of Transportation and Public Facilities, 2301 Peger Road, M/S 2550, Fairbanks, Alaska 99709-5399. For more information, you can also call (907) 451-5320.

Meetings & Events

1995
4th Quarter

DATE	EVENT	SPONSOR/CONTACT	LOCATION
February 4-7	ISSA and AEMA Annual Conference	ISSA Registration Dept. @ (202) 857-1160	Phoenix, Arizona
March 20-24	CONEXPO-CON/AGG '96	Registration Headquarters @ 1-800-366-1364 or Fax 1-800-676-8004	Las Vegas, Nevada
April 8-11	Citizen Participation by Objectives	Alaska T2 Center @ (907) 451-5320	Fairbanks, Alaska
Apr. 15-19	Alaska Transportation Week	DOT&PF/AGC/T2/UAF-TRC/FHWA, (907) 451-5323	Sheraton Anchorage Hotel Anchorage, Alaska
Apr. 16-18 (Anch) 23-25 (Fai)	Worksite Traffic Control Supervisors Training	Alaska T2 Center @ (907) 451-5320	West Coast International Inn Fairbanks Princess Hotel
June 3-7	Pneumatic Equipment Control & Maintenance	Alaska Vocational Technical Center 1-800-478-5389	Seward, Alaska
June 10-14	Boiler 3rd Class & Fireman Exam Preparation Class.	Alaska Vocational Technical Center 1-800-478-5389	Seward, Alaska
June 17-21	Refrigeration Technician Certification Preparation Course	Alaska Vocational Technical Center, 1-800-478-5389	Seward, Alaska
Aug. 12-17	ASCE International Specialty Conference on Cold Regions Engineering	Dr. Larry Bennett @ (907) 474-6121	University of Alaska Fairbanks

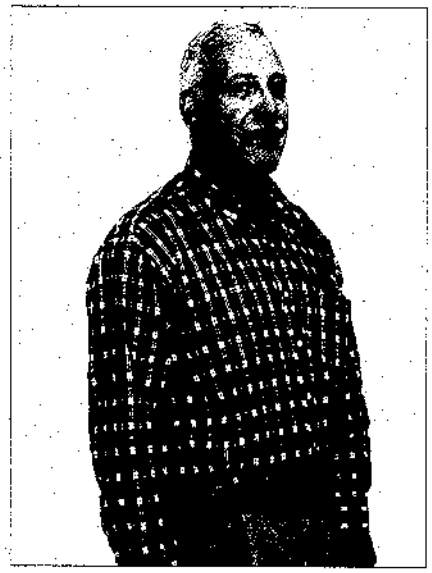
Meetings Around Alaska

Society	Chapter	Meetings Days	Location
ASCE	Anchorage Fairbanks Juneau	Monthly, 3rd Tues., noon Monthly, 3rd Wed., noon Monthly, 1st Wed., noon*	Northern Lights Inn Captain Bartlett Inn Breakwater Inn * except June-August
ASPE	Anchorage Fairbanks	Monthly, 2nd Thurs., noon Monthly, 1st Fri., noon	West Coast International Inn Captain Bartlett Inn
ASPLS	Anchorage Fairbanks Mat-Su Valley	Monthly, 3rd, Tues., noon Monthly, 4th Tues., noon Monthly, last Wed., noon	Executive Cafeteria Federal Building Ethel's Sunset Inn Windbreak Cafe; George Strother, 745-9810
ITE	Anchorage	Monthly, 4th Thurs., noon	Sourdough Mining Company
IRWA	Sourdough Ch. 49 Arctic Trails Ch. 71 Totem Ch. 71	Monthly, 3rd Thurs., noon** Monthly, 2nd Thurs., noon# Monthly, 1st Wed., noon	West Coast Internat'l Inn **except July & Dec. Last Frontier Club #except December Mike's Place, Douglas
ICBO	Northern Chapter	Monthly, 1st Wed., noon	Zach's, Sophie Station
AWRA	Northern Region	Monthly, 3rd Wed., noon Brown Bag Lunch	Room 531 Duckering Bldg., University of Alaska Fairbanks, Larry Hinzman, 474-7331

Mueller follows in his family footsteps

Ernie Mueller carried on a family tradition when he went to work for the Juneau Public Works Department.

His first involvement with the transportation business was when he began serving in his current position as Public Works Director for the City and Borough of Juneau in 1985. While this may have been a first for Mueller, transportation is not something new to his family. Both his father and grandfather worked in the transportation industry for most of their lives.



Although Mueller had a limited transportation background when starting out in his current position, he brought to the job a diversity of experience.

Mueller was born in Fairbanks, Alaska and lived in Fairbanks, Southern California and Washington as a child. He graduated high school from the Midland School in Los Olivos, California, and returned to Fairbanks to attend the University of Alaska Fairbanks where he received two bachelor's degrees in science and education and later a master's degree in science. He also has continued his education up until the present time, enrolling in graduate courses in science, education, psychology and computer systems.

Mueller's job background is as diverse as his education. He worked for a year as a teacher at the Juneau-Douglas High School, and then returned to Fairbanks. After spending a year at UAF as a graduate research assistant, Mueller worked as a research scientist with the U.S. Environmental Protection Agency for eight years, and later served as commissioner of the Alaska Department of Environmental Conservation until 1982. He then spent two years working as a private consultant until he accepted his current position with the City and Borough of Juneau.

Currently, Mueller is responsible for overseeing the operations of the Juneau Public Works Department. The department operates and maintains the streets, public stairways, retaining walls and drainage systems in the city and borough of Juneau. They are also responsible for the public water supply system, the wastewater collection , treatment and disposal system, and Capital Transit, the public transportation system in Juneau.

Mueller says that while working in Juneau he has faced some unique challenges. A big factor in road and street operations and drainage system management is the large amount of rain that falls in the Juneau area.

The Juneau winters present another challenge in road maintenance, because of the continuous freeze-thaw cycles. "It can be snowing heavily one day and be 40 degrees and raining the next day," says Mueller.

Mueller recalls a day one winter afternoon when the entire length of Main Street in downtown Juneau turned to ice in a matter of 15-20 minutes. The icy streets caused four collisions within a ten-minute period, and the police cars could not get to the scenes of the accidents because the road was so slippery. Eventually, to correct the situation, the sand trucks had to back up the road while spreading sand so that their back wheels could get traction.

Despite the sometimes strange weather conditions, Mueller says, there are some advantages to living and working in Juneau. Because Juneau is a capital city and the largest employment base is the government, the residents are generally willing to tax themselves in order to contribute to a better city, he says.

But, Mueller adds, if there is something that the residents do not like, they do not hesitate to call and register a complaint. The overall result, he says, is a very livable community with a lot of public services.

While keeping the Public Works Department in order takes a lot of time, Mueller still finds time for recreation. He and his wife Beverly have a sailboat and enjoy sailing and kayaking off the Juneau coast. They also take in the outdoors on hikes and nature walks and are avid gardeners.

Mueller is also heavily involved in his community. He has been associated with the Boy Scouts for most of his life and now serves on the Southeast Alaska Council Board of Directors. He is also on the board of directors for other organizations including the local public broadcasting stations and the Juneau chapter of the National Council on Alcohol and other Drug Disorders. Mueller is a certified drug and alcohol counselor and volunteers in the local schools helping youth deal with problems of violence and anger management in their lives.

Mueller plans to stay in Juneau indefinitely, and says that he enjoys the community and serving its residents. "This job is very fulfilling because we provide services directly to the people," he says. "In the past my contact has not always been so direct."

For More Information

For back issues of our newsletter and inserts, or to get on our mailing list, write: Alaska Transportation Technology Transfer Program, Department of Transportation and Public Facilities, 2301 Peger Road,